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# EPA Superfund
# Record of Decision:

**TIMES BEACH**
**EPA ID: MOD980685226**
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**TIMES BEACH, MO**
**01/30/1984**

**MINKER, STOUT, CASHEL, SULLINS, QUAIL RUN, AND SONTAG ROAD (ALL IN MISSOURI).**

**#DR**
**DOCUMENTS REVIEWED:**

I HAVE REVIEWED THE FOLLOWING DOCUMENTS WHICH DESCRIBE AND ANALYZE THE COST EFFECTIVENESS OF THE REMEDIAL ALTERNATIVES FOR THE REFERENCED SITES.

- STUDY TITLED: CENTRAL STORAGE SITE REPORT, FEASIBILITY STUDY, MISSOURI DIOXIN SITES
- STUDY TITLED: FINAL REPORT OF THE MISSOURI DIOXIN TASK FORCE
- STUDY TITLED: DRAFT-PHASE I FEASIBILITY STUDY, MINKER/STOUT - IMPERIAL, MISSOURI
- STUDY TITLED: DRAFT-INITIAL REMEDIAL MEASURES, MINKER SITE - IMPERIAL, MISSOURI
- STUDY TITLED: QUICK RESPONSE ENGINEERING ASSESSMENT OF REMOVAL OPTIONS FOR QUAIL RUN MOBILE HOME PARK
- STUDY TITLED: QUICK RESPONSE ENGINEERING ASSESSMENT OF REMOVAL OPTIONS FOR SONTAG ROAD
- STUDY TITLED: QUICK RESPONSE ENGINEERING ASSESSMENT OF REMOVAL OPTIONS FOR SULLINS SITE.

AS DISCUSSED ELSEWHERE IN THIS DOCUMENT, TWO SITES AT WHICH EPA INTENDS TO ACT - QUAIL RUN AND SONTAG ROAD - ARE NOT CURRENTLY LISTED ON THE NATIONAL PRIORITIES LIST. EPA THEREFORE WILL CONDUCT PLANNED REMOVALS AT THESE SITES. FOR PLANNED REMOVALS, THE NATIONAL CONTINGENCY PLAN DOES NOT REQUIRE AN ANALYSIS OF ALTERNATIVES AS IS REQUIRED FOR REMEDIAL ACTIONS. HOWEVER, BECAUSE THE ACTIONS RECOMMENDED FOR QUAIL RUN AND SONTAG ROAD ARE SIMILAR TO THOSE RECOMMENDED FOR THE OTHER SITES, EPA INCLUDED QUAIL RUN AND SONTAG ROAD IN THE ANALYSIS OF ALTERNATIVES. THIS RECORD OF DECISION WILL ONLY DISCUSS THESE TWO SITES SEPARATELY WHERE THE FACT THAT THEY ARE NOT ON THE NATIONAL PRIORITIES LIST SUBSTANTIVELY AFFECTS THE FINDINGS REQUIRED OR ACTIONS ALLOWED.

THE INTERIM STORAGE FACILITY WILL BE LOCATED IN TIMES BEACH AND WILL HAVE A LIMITED CAPACITY TO STORE CONTAMINATED SOIL FROM ONLY THE HIGHEST PRIORITY SITES. AN ONGOING FEASIBILITY STUDY FOR TIMES BEACH WILL CONSIDER THE DISPOSITION OF SOIL FROM THE REMAINING SITES IN THE STATE.

**#DE**
**DECLARATIONS:**

EPA HAS CONSULTED THE STATE OF MISSOURI BEFORE DETERMINING THE APPROPRIATE REMEDIAL ACTION, AS WITNESSED BY THE ATTACHED LETTER FROM THE DIRECTOR OF THE MISSOURI DEPARTMENT OF NATURAL RESOURCES. CONSISTENT WITH THE COMPREHENSIVE ENVIRONMENTAL RESPONSE, COMPENSATION, AND LIABILITY ACT OF 1980 (CERCLA) AND THE NATIONAL CONTINGENCY PLAN, I DECLARE THE FOLLOWING:

- THE SELECTED OPTION IS TECHNICALLY FEASIBLE, COST EFFECTIVE AND CONSISTENT WITH FINAL REMEDIAL ALTERNATIVES AS PRESENTED IN THE FEASIBILITY STUDY PROVIDED FOR PUBLIC COMMENT.

- THE PROPOSED REMEDIAL ACTION AT MINKER, STOUT, CASHEL, AND SULLINS IS NECESSARY TO PROTECT HUMAN HEALTH AND THE ENVIRONMENT.

- THE PROPOSED PLANNED REMOVAL ACTIONS AT QUAIL RUN AND SONTAG ROAD ARE NEEDED TO MITIGATE THE RISK OF EXPOSURE TO DIOXIN BY AREA RESIDENTS AND THE ENVIRONMENT. FURTHER, PURSUANT TO SECTION 300.67(C) OF THE NATIONAL CONTINGENCY PLAN, I FIND THAT IT IS NECESSARY TO SUSPEND THE $1 MILLION CEILING AND 6 MONTH LIMIT FOR EACH SITE DUE TO THE IMMEDIATE RISK TO PUBLIC HEALTH, THE IMMEDIATE NEED FOR CONTINUED RESPONSE TO MITIGATE THE RISK, AND

THE FACT THAT ASSISTANCE WILL NOT OTHERWISE BE PROVIDED ON A TIMELY BASIS. THE ACTIONS ARE NECESSARY TO MITIGATE DIRECT CONTACT AND SURFACE/SUBSURFACE MIGRATION THREATS POSED AT THE SITES.

- THE ACTION BEING TAKEN IS APPROPRIATE WHEN BALANCED AGAINST THE NEED TO USE TRUST FUND MONEY AT OTHER SITES.

- OFF-SITE TRANSPORT OF HAZARDOUS SUBSTANCES IS MORE COST-EFFECTIVE THAN OTHER FORMS OF REMEDIAL ACTION, AND, THEREFORE, CONSISTENT WITH SECTION 101(24) OF CERCLA AND SECTION 300.70(C) OF THE NATIONAL CONTINGENCY PLAN.

LEE M. THOMAS
ASSISTANT ADMINISTRATOR.

## NARRATIVE SUMMARY

**BACKGROUND**

THIS SUMMARY DOCUMENTS THE REMEDIAL AND REMOVAL MEASURES RECOMMENDED BY REGION VII AND THE STATE OF MISSOURI FOR THE MINKER, STOUT, CASHEL, SULLINS, QUAIL RUN, AND SONTAG ROAD SITES. THE SIX SITES ARE RESIDENTIAL SITES IN ST. LOUIS, FRANKLIN, AND JEFFERSON COUNTIES IN MISSOURI. ALL ARE CONTAMINATED WITH 2,3,7,8-TETRACHLORODIBENZO-P-DIOXIN (DIOXIN OR TCDD), AND HAVE BEEN RECOMMENDED AS HIGH PRIORITY SITES BY THE MISSOURI DIOXIN TASK FORCE AND THE GOVERNOR OF MISSOURI.

THE FINAL REPORT OF THE MISSOURI DIOXIN TASK FORCE WAS SUBMITTED TO THE GOVERNOR ON OCTOBER 31, 1983. THE TASK FORCE DEVELOPED RECOMMENDATIONS AND PRIORITIES BASED ON OVERALL RISK TO RESIDENTS, WORKERS AND THE ENVIRONMENT; EXPOSURE RISK TO RESIDENTS (ESPECIALLY CHILDREN) AND WORKERS; POTENTIAL FOR EROSION AND DUSTING; MAINTENANCE OF NEIGHBORHOODS AND PROPERTY VALUES; AND LONG-TERM EFFECTS ON MISSOURI AND ITS CITIZENS. SONTAG ROAD AND QUAIL RUN WERE ASSIGNED THE HIGHEST PRIORITY WITH EXCAVATION AND OFF-SITE INTERIM STORAGE RECOMMENDED AS SOON AS POSSIBLE. MINKER, STOUT, SADDLE AND SPUR CLUB, CASHEL, SULLINS, AND ROMAINE CREEK WERE ASSIGNED SECOND PRIORITY WHERE EXCAVATION AND OFF-SITE STORAGE SHOULD BE CONSIDERED WITH SHORT-TERM STABILIZATION ACTIONS IN THE INTERIM. THE SADDLE AND SPUR CLUB WILL BE ADDRESSED THROUGH ENFORCEMENT ACTION. AS A LONG-TERM STATE-WIDE SOLUTION, THE TASK FORCE RECOMMENDED SECURE CENTRAL STORAGE UNTIL PROVEN TECHNOLOGY IS AVAILABLE TO DESTROY DIOXIN IN CONTAMINATED SOIL WITH MINIMUM RISK TO PUBLIC HEALTH AND THE ENVIRONMENT.

TO DATE THERE ARE 33 SITES IN MISSOURI KNOWN TO BE CONTAMINATED. THE MAJORITY OF THESE SITES ARE NOT RESIDENTIAL SITES. THE CENTERS FOR DISEASE CONTROL (CDC) HAS RECENTLY RELEASED A REPORT TITLED: HEALTH IMPLICATION OF 2,3,7,8-TETRACHLORODIBENZO-P-DIOXIN (TCDD) CONTAMINATION OF RESIDENTIAL SOIL WHICH CONCLUDED "THAT SOIL LEVELS OF 1 PPB TCDD IN RESIDENTIAL AREAS IS A REASONABLE LEVEL AT WHICH TO EXPRESS CONCERN ABOUT HEALTH RISKS.". THE CONCLUSION APPLIES TO PROLONGED EXPOSURES AND THE SIX RESIDENTIAL AREAS ALL HAVE DIOXIN CONCENTRATIONS GREATER THAN 1 PPB.

EPA HAS TAKEN SEVERAL ACTIONS AT THESE SIX PRIORITY SITES, INCLUDING:

- DRAFT FEASIBILITY STUDY AND A DRAFT INITIAL REMEDIAL MEASURES REPORT FOR MINKER/STOUT.
- QUICK RESPONSE ENGINEERING ASSESSMENT OF REMOVAL OPTIONS FOR QUAIL RUN; SONTAG ROAD; AND SULLINS SITES.
- PERMANENT RELOCATION OFFERS FOR ELEVEN FAMILIES AT THE MINKER/STOUT SITE.
- TEMPORARY RELOCATION OFFERS TO TWO MINKER NEIGHBORS.
- TEMPORARY RELOCATION OFFERS TO ABOUT 100 RESIDENTS OF THE QUAIL RUN MOBILE HOME PARK.
- REMOVAL ACTIONS AT SONTAG ROAD, INCLUDING APPLICATION OF DUST SUPPRESSANTS, VACUUMING ALONG ROADS AND IN RESIDENCES, AND PAVING WHERE THE HIGHEST DIOXIN LEVELS WERE FOUND.

**#SLD**
**SITE DESCRIPTIONS/EXTENT OF CONTAMINATION**

A) MINKER: SOUTH OF THE MINKER HOUSE IS A GULLEY WHERE FILL MATERIAL CONTAMINATED WITH TCDD WAS PLACED IN AN ATTEMPT TO ALLEVIATE AN EROSION PROBLEM. THE MINKER RESIDENCE IS LOCATED ON THE TOP OF A RIDGE WITH RUNOFF DRAINING INTO ROMAINE CREEK. VISUAL OBSERVATIONS INDICATE THAT MUCH OF THE FILL MATERIAL HAS ERODED DOWN THE HILL INTO THE YARDS OF NEIGHBORING HOMES AND INTO ROMAINE CREEK. FOUR OTHER RESIDENCES ARE LOCATED DOWNHILL FROM THE MINKER HOUSE AND ONE OTHER HOUSE IS IMMEDIATELY ADJACENT TO THE MINKER RESIDENCE. ANALYSES OF SAMPLES COLLECTED FROM THE MINKER FILL AREA, YARDS OF DOWN-GRADIENT HOMES, AND SEDIMENTS FROM ROMAINE CREEK REVEAL THAT CONTAMINATION FROM TCDD IS WIDESPREAD OVER THE APPROXIMATELY 3-ACRE MINKER RESIDENTIAL AREA, INCLUDING APPROXIMATELY 6,000 FEET DOWNSTREAM IN ROMAINE CREEK.

DURING SAMPLING, A TOPSOIL DEPTH OF ONLY 8 TO 12 INCHES WAS OBSERVED IN MAN MANY LOCATIONS OVER A JOINTED LIMESTONE AND POROUS SANDSTONE. VERTICAL MOVEMENT OF SURFACE WATER WITH SOIL PARTICLES FROM THE MINKER SITE INTO THE LIMESTONE IS POSSIBLE AND COULD CONTAMINATE THE SHALLOW AQUIFER ABOVE THE BUSHBERG SANDSTONE LAYER. THE SHALLOW GROUND WATER MAY EMERGE IN THE GAINING REACH OF ROMAINE CREEK OR ITS TRIBUTARIES.

EPA HAS CONDUCTED EXTENSIVE SAMPLING IN THE MINKER AND ROMAINE CREEK AREAS. OF APPROXIMATELY 250 SAMPLES FROM THE MINKER SITE AND ADJACENT AREAS, 54 SAMPLES HAVE SHOWN CONCENTRATIONS ABOVE 1 PPB. CONCENTRATIONS OVER 300 PPB HAVE BEEN MEASURED IN THE FILL AREA ITSELF.

SEVERAL HOMES ARE LOCATED ACROSS WEST ROCK CREEK ROAD FROM THE MINKER SITE. RECENT SAMPLING REVEALED CONCENTRATIONS ABOVE 1 PPB IN THE YARDS OF TWO OF THESE PROPERTIES.

B) STOUT: CONTAMINATED SOIL FROM THE BUBBLING SPRINGS RANCH WAS TAKEN TO THE STOUT SITE AT THE SAME TIME IT WAS BEING USED AS FILL AT THE MINKER SITE. THE FILL MATERIAL WAS USED TO MAKE A LEVEL LOT FOR TWO TRAILER PADS. EPA SAMPLING FOUND CONTAMINATION THROUGHOUT THE FILL FROM 1 PPB TO 200 PPB, DOWN TO A DEPTH OF 20 FEET.

RUNOFF FROM THE STOUT SITE IS THOUGHT TO BE PRIMARILY SURFACE FLOW, ALTHOUGH SUBSURFACE FLOW HAS BEEN NOTED IN ADJACENT AREAS. THE SURFACE FLOW IS SOUTHERLY TOWARD ROCK CREEK. SAMPLES BETWEEN THE FILL AREA AND ROCK CREEK SHOW THAT SOME SURFACE MIGRATION IS TAKING PLACE. THE SITE IS LOCATED OVER A POROUS SANDSTONE AND JOINTED LIMESTONE.

IN DECEMBER 1982, CDC ISSUED A HEALTH ADVISORY FOR THE SIX FAMILIES AT THE MINKER SITE. ON MARCH 17, 1983, THE CDC EXTENDED ITS FINDINGS OF A HEALTH RISK TO INCLUDE THE TWO TRAILERS AND THREE HOMES AT THE STOUT SITE. ON APRIL 7, 1983, CDC AGAIN EXTENDED ITS HEALTH ADVISORY TO INCLUDE A SEVENTH HOUSEHOLD NEXT TO THE MINKER HOME AND A HOUSE ON ROMAINE CREEK. ON APRIL 19, 1983, EPA AUTHORIZED THE FEDERAL EMERGENCY MANAGEMENT AGENCY (FEMA) TO OFFER PERMANENT RELOCATION TO THESE FAMILIES AS A RESULT OF A CAREFUL ANALYSIS OF THE HEALTH ADVISORY AND COST-EFFECTIVENESS OF PERMANENT VERSUS TEMPORARY RELOCATION. THE CDC EXTENDED ITS HEALTH ADVISORY TO INCLUDE TWO ADDITIONAL FAMILIES ACROSS WEST ROCK CREEK ROAD AND OFFERS OF TEMPORARY RELOCATION HAVE BEEN MADE BY EPA.

C) CASHEL: THE CASHEL RESIDENCE IS LOCATED 0.3 MILES NORTH OF THE MINKER SITE ON WEST ROMAINE CREEK ROAD. WHEN CONTAMINATED SOIL WAS EXCAVATED FROM THE BUBBLING SPRINGS RANCH ARENA IN 1973, MR. CASHEL FLAGGED DOWN TWO DEPARTING TRUCKS AND THUS OBTAINED TWO LOADS OF DIRT, WHICH WERE DEPOSITED IN HIS GARDEN. SUBSEQUENTLY, NOTHING WOULD GROW IN THE GARDEN, AND TWO APPLE TREES DIED. THE DIRT WAS SCRAPED UP AND DEPOSITED IN A PILE ALONG THE EDGE OF THE PROPERTY.

THE PROPERTY IS LOCATED ON A RIDGE WITH NEIGHBORING RESIDENCES LOCATED ON BOTH SIDES. THE SOIL LAYER IS RELATIVELY THIN, ONLY A FEW FEET THICK, WITH MODERATE TO HIGH PERMEABILITY. SAMPLES WERE TAKEN NEAR THE SURFACE WITH ONE MEASUREMENT AS HIGH AS 250 PPB. OTHER SAMPLES RANGED FROM 10-70 PPB DIOXIN.

D) SULLINS: THE SULLINS HOME IS LOCATED ABOUT ONE MILE WEST OF THE BUBBLING SPRINGS RANCH ARENA. ABOUT 14 CUBIC YARDS OF CONTAMINATED SOIL FROM THE ARENA WAS USED TO FILL A DEPRESSION LEFT FROM THE REMOVAL OF A LARGE TREE. THE FILL AREA IS ABOUT 20 FEET FROM ROMAINE CREEK. THERE IS ONE HOME DIRECTLY ACROSS THE STREET FROM THE SULLINS', AND A TRAILER COURT ADJACENT TO THE CREEK AND DOWNSTREAM OF THE FILL AREA. INITIAL SAMPLING SHOWED CONTAMINATION LEVELS UP TO 99 PPB. SUBSEQUENT SAMPLING DID NOT CONFIRM MIGRATION OF CONTAMINATION BUT FOUND LEVELS AS HIGH AS 820 PPB.

E) QUAIL RUN MOBILE HOME PARK: THE MAIN ROAD THROUGH THE MOBILE HOME PARK WAS SPRAYED WITH CONTAMINATED WASTE OIL IN THE EARLY 1970'S. THE OIL APPARENTLY WAS HIGHLY

CONTAMINATED, BASED ON THE HIGH TCDD LEVELS FOUND AT THE SITE. THE SITE WAS SAMPLED A SECOND TIME AFTER SCREENING SAMPLING REVEALED FAIRLY WIDESPREAD CONTAMINATION. THIS WIDESPREAD CONTAMINATION WAS CAUSED WHEN CONTAMINATED ROAD MATERIALS WERE EXCAVATED AND USED AS FILL MATERIAL. ALSO THE CONTAMINATION HAS SPREAD AS A RESULT OF WIND-BORNE DUST AND STORM WATER TRANSPORT. THE MOBILE HOME PARK COVERS APPROXIMATELY 27 ACRES AND CONSISTS OF 38 TRAILER PADS AND CURRENTLY 28 MOBILE HOMES. THE ENTRANCE TO THE PARK IS AT THE TOP OF A RIDGE AND THE SITE SLOPES TOWARD LITTLE FOX CREEK. OF 315 SAMPLES COLLECTED, 136 HAD DIOXIN LEVELS GREATER THAN 1 PPB, WITH THE HIGHEST CONCENTRATION AT 1,100 PPB. IN ADDITION TO QUAIL RUN ROAD, RESIDENTIAL YARDS, AND THE FILL AREA, CONCENTRATIONS GREATER THAN 1 PPB HAVE BEEN MEASURED IN LITTLE FOX CREEK, DUST SAMPLES FROM 18 MOBILE HOMES, AREAS SOUTH OF THE PARK ENTRANCE, AND THE SHOULDER OF HIGHWAY 100 OPPOSITE THE PARK ENTRANCE.

ABOUT 100 RESIDENTS OF THE PARK WERE OFFERED TEMPORARY RELOCATION IN MAY 1983 AS PART OF AN IMMEDIATE REMOVAL ACTION. THE SITE HAS BEEN PROPOSED FOR ADDITION TO THE NATIONAL PRIORITIES LIST (NPL). HOWEVER, ADDITION TO THE NPL IS DEPENDENT ON A CHANGE IN THE NATIONAL CONTINGENCY PLAN.

F) SONTAG ROAD: SONTAG ROAD IS IN THE CASTLEWOOD SUBDIVISION LOCATED IN ST. LOUIS COUNTY. IN THE EARLY 1970'S, BLISS OIL CO. SPRAYED DIOXIN CONTAMINATED WASTE OIL ON THE TWO ENTRANCE DRIVEWAYS TO THE CASTLEWOOD SWIM CLUB AS WELL AS ON SONTAG ROAD FOR A DISTANCE APPROXIMATELY 2,000 FEET WEST FROM NEW BALLWIN ROAD. SINCE THAT TIME, THE ROAD HAS BEEN PAVED AND THE SWIM CLUB HAS BEEN CLOSED.

THE SONTAG ROAD SITE CONSISTS OF SONTAG ROAD, SHOULDERS ALONG NEW BALLWIN ROAD, A LARGE NUMBER OF RESIDENCES, THE ABANDONED SWIM CLUB, A TAVERN, AND A FIRE STATION. THE SITE IS IN THE SPRING BRANCH CREEK VALLEY. THE AFFECTED POPULATION WITHIN A 2,000-FOOT RADIUS OF THE SWIM CLUB IS ABOUT 700. THE AREA IS LOCATED JUST UPSTREAM OF THE CONFLUENCE OF SPRING BRANCH AND KEIFER CREEK AND ABOUT ONE MILE FROM THE MERAMEC RIVER. SONTAG ROAD LIES IN THE FLOODPLAIN OF THE SPRING BRANCH CREEK.

SOIL IN THE AREA IS A SILTY CLAY UNDERLAIN BY A GRAVELLY SILTY CLAY WITH SOME SAND. SURFACE SOILS ARE CHARACTERIZED AS HAVING MODERATELY HIGH PERMEABILITY, AND THUS PRESENT SEVERE LIMITATIONS FOR CONSTRUCTING DIKES, LEVEES, AND EMBANKMENTS DUE TO SEEPAGE AND EASE OF EROSION.

EPA HAS INITIATED SOME TEMPORARY REMOVAL ACTIONS CONSISTING OF THE APPLICATION OF DUST SUPPRESSANT TO ROAD SHOULDERS AND GRAVEL DRIVEWAYS, USING HIGH-EFFICIENCY VACUUM CLEANERS TO CLEAN UP LOOSE PARTICLES AROUND ROADS AND RESIDENCES, AND PAVING WHERE THE HIGHEST TCDD LEVELS WERE FOUND.

THE CENTERS FOR DISEASE CONTROL AND THE MISSOURI DIVISION OF HEALTH HAVE ISSUED HEALTH ADVISORIES FOR THE SIX PRIORITY SITES UNDER CONSIDERATION. IN GENERAL, THESE ADVISORIES CITE THE POTENTIAL FOR ADVERSE HEALTH EFFECTS DUE TO LONG-TERM EXPOSURE TO CONTAMINATED SOIL UNDER EXISTING CONDITIONS AT THESE SITES.

A NO-ACTION ALTERNATIVE IS UNACCEPTABLE DUE TO THE PROVISIONS OF THE HEALTH ADVISORIES. A SECOND ALTERNATIVE CONSISTS OF RELOCATION OF THE RESIDENTS WHO ARE DIRECTLY AFFECTED BY THE HEALTH ADVISORIES. PERMANENT RELOCATION IS CURRENTLY UNDERWAY FOR ELEVEN FAMILIES AT THE MINKER SITE. PERMANENT RELOCATION OFFERS HAVE ALSO BEEN MADE TO RESIDENTS OF TIMES BEACH AND TEMPORARY RELOCATION OFFERS TO QUAIL RUN RESIDENTS. EXPERIENCE SHOWS THAT THESE VOLUNTARY RELOCATIONS HAVE NOT BEEN COMPLETELY SUCCESSFUL IN REMOVING ALL PEOPLE FROM THE CONTAMINATION. UNDER THE COMPREHENSIVE ENVIRONMENTAL RESPONSE COMPENSATION, AND LIABILITY ACT OF 1980 (CERCLA), PERMANENT RELOCATION CAN ONLY BE OFFERED TO RESIDENTS AT A SITE ON THE NATIONAL PRIORITIES LIST. THUS, RESIDENTS OF QUAIL RUN AND SONTAG ROAD CANNOT RECEIVE PERMANENT RELOCATION OFFERS. IN ADDITION, THE SIX SITES UNDER CONSIDERATION ARE IN RESIDENTIAL AREAS AND REQUIRE MEASURES TO KEEP NEIGHBORING RESIDENTS FROM ACCIDENTAL EXPOSURE. THE POTENTIAL FOR SURFACE AND SUBSURFACE MIGRATION OF THE CONTAMINATION EXISTS IN VARIOUS DEGREES AT THE DIFFERENT SITES. THIS PROBLEM IS THE MOST SEVERE AT THE MINKER SITE, WHILE EVIDENCE OF SURFACE SPREADING HAS BEEN OBSERVED AT STOUT,

CASHEL, QUAIL RUN, AND SONTAG ROAD. THEREFORE, UNACCEPTABLY HIGH PUBLIC HEALTH AND ENVIRONMENTAL RISKS REQUIRE CONSIDERATION OF RESPONSE ALTERNATIVES BEYOND RELOCATION OF PEOPLE FROM THE SITES.

**#AE**
**FEASIBILITY STUDY ALTERNATIVES**

REMEDIAL INVESTIGATIONS AT THE SIX SITES HAVE BEEN CARRIED OUT OVER THE LAST 10 MONTHS. A FEASIBILITY STUDY ADDRESSING ALL SIX SITES AND TITLED "CENTRAL STORAGE SITE REPORT, FEASIBILITY STUDY, MISSOURI DIOXIN SITES," WAS COMPLETED DECEMBER 6, 1983. IN THAT STUDY, SEVEN REMEDIAL ALTERNATIVES, INCLUDING A NO-ACTION ALTERNATIVE, WERE CONSIDERED. IN ACCORDANCE WITH THE NATIONAL CONTINGENCY PLAN, EACH ALTERNATIVE WAS EXAMINED ACCORDING TO THREE CRITERIA: (1) ENGINEERING, (2) HEALTH AND ENVIRONMENT, AND (3) ECONOMICS. THE NO ACTION ALTERNATIVE WAS DETERMINED TO BE UNACCEPTABLE BECAUSE IT WOULD NOT ADEQUATELY PROTECT PUBLIC HEALTH AND THE ENVIRONMENT.

THE OTHER SIX ALTERNATIVES CONSIDERED IN THE FEASIBILITY STUDY WERE:

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| A - STABILIZE SOIL IN PLACE | $41.5 M |
| B - INTERIM STORAGE ON-SITE | $35.0 M |
| C - DISPOSAL OFF-SITE | $32.2 M |
| D - INCINERATION | $111.6 M |
| E - SOLVENT EXTRACTION | $151.6 M |
| F - INTERIM STORAGE OFF-SITE | $15.7 M. |

THE COSTS FOR THE TWO ON-SITE ALTERNATIVES (A) AND (B) INCLUDE PERMANENT RELOCATION FOR RESIDENTS ON THE SITES. COSTS FOR THE PREVIOUS BUY OUTS AT MINKER AND STOUT ARE NOT INCLUDED SINCE THESE ARE COSTS THAT WOULD APPLY TO ANY FUTURE ACTIONS. COSTS FOR TEMPORARY RELOCATIONS DURING EXCAVATION ARE INCLUDED FOR THE OFF-SITE ALTERNATIVES (C), (D), (E), AND (F).

TREATMENT ALTERNATIVES (D) AND (E) HAVE THE ADVANTAGE OF REDUCING DIOXIN LEVELS AND THUS REDUCING THE NEED FOR LONG-TERM MONITORING AND SURVEILLANCE. HOWEVER, THESE ALTERNATIVES REQUIRE GREATER SOIL HANDLING THAN CONTAINMENT OPTIONS AND MAY PRESENT A GREATER EXPOSURE RISK TO WORKERS. SOLVENT EXTRACTION WOULD INVOLVE HIGH RISKS ASSOCIATED WITH SOLUBILIZED DIOXIN. THE TREATMENT TECHNOLOGIES HAVE NOT BEEN DEMONSTRATED TO BE PRACTICAL AT THIS TIME FOR CONTAMINATED SOILS. THERE ARE UNCERTAINTIES AS TO WHETHER THE ASH OR SOIL REMAINING AFTER TREATMENT COULD BE DELISTED UNDER RCRA. IF THE SOILS ARE NOT DELISTED, THEY WILL STILL REQUIRE DISPOSAL IN A SECURE STORAGE FACILITY OR LANDFILL, THOUGH THESE COSTS ARE NOT INCLUDED IN THE ESTIMATES. COSTS FOR THE TREATMENT ALTERNATIVES ARE CONSIDERABLY HIGHER THAN THOSE FOR CONTAINMENT.

CONTAINMENT ALTERNATIVES (A) THROUGH (C) ARE TECHNICALLY FEASIBLE AT THE PRESENT TIME. ALTERNATIVES (A) AND (B) ARE ON-SITE MEASURES. DURING SEPTEMBER 1983, A PUBLIC MEETING WAS HELD ON PROPOSED INTERIM ON-SITE STORAGE OPTION AT THE MINKER SITE. THE COMMENTS FROM THIS MEETING, AND ALSO COMMENTS RECEIVED FOR ON-SITE INTERIM STORAGE PROPOSALS AT QUAIL RUN AND SONTAG ROAD, INDICATED PUBLIC OPPOSITION TO ON-SITE MEASURES AND SUPPORT FOR EXCAVATION AND RESTORATION OF THE SITES. FURTHER DISCUSSION OF ALTERNATIVES (A) AND (B) IS CONTAINED IN THE OFF-SITE DISPOSAL ANALYSIS WHICH FOLLOWS.

ALTERNATIVE (C), DISPOSAL OFF-SITE, ASSUMES THE AVAILABILITY OF A SECURE LANDFILL. AT THE PRESENT TIME, THERE ARE NO PERMITTED HAZARDOUS WASTE FACILITIES IN MISSOURI FOR THE DISPOSAL OF 50,000 CUBIC YARDS OF CONTAMINATED SOIL.

BASED ON THE THREE CRITERIA OF THE NATIONAL CONTINGENCY PLAN, INTERIM STORAGE OFF-SITE IS THE BEST ALTERNATIVE. IT IS TECHNICALLY FEASIBLE, IT IS THE LEAST COSTLY AND MOST COST-EFFECTIVE APPROACH, AND IT CAN BE IMPLEMENTED IN SUCH A WAY THAT PROTECTION OF THE ENVIRONMENT WILL BE ENSURED. ALTHOUGH THE FACILITY WILL BE CONSERVATIVELY DESIGNED TO PROVIDE LONG-TERM SECURE STORAGE, THE INTENT OF THIS OPTION INCLUDES AN ACCELERATED TECHNOLOGY EVALUATION PHASE DIRECTED TOWARD A PERMANENT DISPOSITION OF THE CONTAMINATED

SOIL AND CLOSURE OF THE FACILITY. IMPLEMENTATION OF THE ALTERNATIVE WILL INVOLVE FIVE STEPS:

- CONSTRUCTION OF AN APPROXIMATELY 50,000 CUBIC YARD TEMPORARY STORAGE FACILITY AT TIMES BEACH, MISSOURI.
- TEMPORARY RELOCATION OF PEOPLE LIVING AT OR NEAR THE SIX SITES.
- EXCAVATION OF THE CONTAMINATED SOIL AND TRANSPORTATION TO THE STORAGE FACILITY.
- RESTORATION AND RE-INHABITATION OF THE SITES.
- COVERING THE STORAGE FACILITY WITH A FLEXIBLE COVER.

RELATION TO OTHER STUDIES

THE OFFICE OF TECHNOLOGY ASSESSMENT (OTA) PREPARED A STAFF MEMORANDUM IN DECEMBER 1983 REVIEWING THE RECOMMENDATIONS OF THE MISSOURI DIOXIN TASK FORCE. THE OTA REPORT AGREES WITH THE TASK FORCE'S FINDING THAT FEASIBLE TECHNOLOGIES FOR THE TREATMENT OF DIOXIN CONTAMINATED SOILS ARE NOT YET FULLY PROVEN. HOWEVER, OTA ASSERTS THAT ADDITIONAL TECHNOLOGY EVALUATION SHOULD BE SPONSORED FOR AT LEAST ONE YEAR BEFORE ENDORSING A LONG-TERM STRATEGY FOR STORAGE OF CONTAMINATED SOIL AS AN INTERIM STEP UNTIL TREATMENT TECHNOLOGIES CAN BE SUCCESSFULLY DEMONSTRATED. THE OTA REPORT SUGGESTS THAT THE STATE OF MISSOURI AND EPA CONSIDER THE OPTION OF EMBARKING ON A HIGH PRIORITY PROGRAM TO FURTHER EXAMINE AND EVALUATE TECHNOLOGICAL OPTIONS FOR PROCEEDING DIRECTLY TOWARD A PERMANENT SOLUTION TO THE CONTAMINATED SOIL PROBLEM. THE REPORT ALSO SUGGESTS, IN THE INTERIM, THAT NECESSARY EMERGENCY ACTIONS AT SITES WHICH POSE A HEALTH OR ENVIRONMENTAL THREAT COULD BE PURSUED, AND PERHAPS THE FIRST STAGE STORAGE OPTION COULD BE CONSTRUCTED.

THE AGENCY'S DIOXIN STRATEGY DOCUMENT DATED NOVEMBER 28, 1983, STATES THAT THE ALTERNATIVES WHICH APPEAR TO BE MOST SUITABLE FOR UNCONTROLLED SITES ARE AS FOLLOWS:

1) SECURE SOIL IN PLACE -- IN SITU SOIL FIXATION, SUBSURFACE PERIMETER GROUT CURTAIN, IMPERMEABLE CAP, DIVERSION OF SURFACE RUNOFF, RESIDENT RELOCATION FROM IMMEDIATE AREA AND MONITORING.

2) CONSOLIDATE AND SECURE SOIL -- REMOVAL OF SOIL TO SECURE LANDFILL; OR CONTAINMENT OF SOIL IN A CONCRETE VAULT, POSSIBLY ON-SITE.

3) INCINERATION -- FOLLOWING EXCAVATION AND TRANSPORTATION, A SIZE REDUCTION PROCESS IS REQUIRED BEFORE INCINERATION.

4) SOLVENT EXTRACTION -- SOLVENTS WOULD BE USED TO EXTRACT DIOXIN FROM THE SOIL INTO A SOLUBLE FORM. SEVERAL DIFFERENT TECHNOLOGIES COULD THEN BE USED TO DESTROY THE DIOXIN.

THE DIOXIN STRATEGY REPORT ALSO STATES THAT SEVERAL IMPORTANT QUESTIONS NEED TO BE ADDRESSED THROUGH PILOT STUDIES BEFORE THESE ALTERNATIVES CAN BE FULLY EVALUATED. AS A FIRST STEP, ORD WILL CONSIDER INCLUDING AN ABSORPTION/DESORPTION STUDY ON CONTAMINATED SOILS AS PART OF ITS RESEARCH AGENDA TO DETERMINE DIOXIN RELEASE RATES. WHILE THE TREATMENT TECHNOLOGIES (3) AND (4) MAY PRESENT THE ULTIMATE SOLUTION TO CONTAMINATED MEDIA, THEY COULD PRESENT SIGNIFICANT HEALTH RISKS DURING PROCESSING. THUS, DURING THE PILOT TESTING PHASE, THE POTENTIAL FOR FURTHER CONTAMINATION MUST BE ASSESSED. BASED UPON THE SUCCESS OF THE PILOT TESTING PHASE, ORD WILL THEN BE ABLE TO IMPLEMENT THE FULL FIELD VALIDATION STUDIES. THE RESULTS OF PILOT TESTING AND FULL FIELD VALIDATION WILL BE USED TO EVALUATE ALTERNATIVES FOR CLEAN-UP GIVEN SPECIFIC CONDITIONS OF CONTAMINATION AND EXPOSURE.

THE CURRENT REMEDIAL PROPOSAL IS CONSISTENT WITH BOTH THE AGENCY STRATEGY AND THE OTA REPORT. THE PROPOSED INTERIM STORAGE FACILITY IS LIMITED TO APPROXIMATELY 50,000 CUBIC YARDS WHERE THE VOLUME OF CONTAMINATED SOIL IN THE ENTIRE STATE HAS BEEN ESTIMATED TO BE ABOUT 500,000 CUBIC YARDS. THIS INITIAL REMEDIAL PROJECT IS FOCUSED ON SOLVING THE SHORT TERM HEALTH PROBLEMS AT SIX SITES AND INCLUDES PROVISIONS TO FACILITATE RESEARCH ON

THE PERMANENT DESTRUCTION OF THE CONTAMINATED SOILS. SEVERAL SEALED BINS OF SOIL WILL BE STORED SEPARATELY FROM THE FACILITY TO PROVIDE SMALL QUANTITIES OF SOIL FOR BENCH-SCALE STUDIES AND LARGER QUANTITIES FOR PILOT SCALE DEMONSTRATIONS. ADDITIONALLY, TO THE EXTENT POSSIBLE, SOILS WILL BE SEGREGATED WITHIN THE FACILITY ACCORDING TO CHARACTERISTICS RELEVANT TO FUTURE TREATMENT.

THE LARGE VOLUME OF SOIL REMAINING AT UNCONTROLLED SITES AFTER EXCAVATION OF THE PRIORITY SITES WILL BE ADDRESSED AS PART OF A SECOND PHASE EFFORT. AT THIS TIME OTHER STUDIES ARE UNDERWAY (TIMES BEACH AND ELLISVILLE) WHICH WILL ADDRESS THE LONGER TERM SOLUTIONS FOR OTHER DIOXIN SITES IN THE STATE OF MISSOURI. THESE STUDIES WILL CAREFULLY EVALUATE THE RECOMMENDATIONS CONTAINED IN THE OTA REPORT AND DEVELOP ALTERNATIVES THAT ARE CONSISTENT WITH THE AGENCY'S DIOXIN STRATEGY, THE MISSOURI DIOXIN TASK FORCE REPORT AND, TO THE EXTENT POSSIBLE, THE OTA REPORT. DURING THE INTERIM, IMMEDIATE ON-SITE MEASURES WILL BE TAKEN AS NEEDED AT THE CONFIRMED SITES INCLUDING THE HORSE ARENAS AND RELATED SITES UNDER ENFORCEMENT ACTION. THE ON-SITE MEASURES WILL FOCUS ON EROSION CONTROL THROUGH SURFACE WATER DIVERSION METHODS, POROUS COVER MATERIALS, OR IN-PLACE FIXATION.

POLICY ISSUES

THREE ISSUES ARE IMPORTANT TO THE AA IN SELECTING THE REMEDIAL ALTERNATIVE FOR THE SIX SITES.

1. THE STORAGE FACILITY IS TO BE CONSTRUCTED IN A FLOODPLAIN. SEVERAL COMMENTS RECEIVED DURING THE PUBLIC COMMENT PERIOD CONCERNED THIS FACT AND THESE COMMENTS ARE ADDRESSED IN THE RESPONSIVENESS SUMMARY. THE FEASIBILITY STUDY INCLUDED AN ANALYSIS OF ALTERNATIVE SITES FOR THE FACILITY. TWELVE LOCATIONS WERE SELECTED BY EPA AND THE MISSOURI DEPARTMENT OF NATURAL RESOURCES AS POTENTIAL SITES FOR A CENTRAL STORAGE FACILITY. THIS LIST OF 12 SITES WAS NUMERICALLY EVALUATED AGAINST 8 CRITERIA TO DEVELOP A RANKING. THE CRITERIA RELATED TO SITE OWNERSHIP, LOCATION IN AN AREA ALREADY CONTAMINATED WITH DIOXIN, PROXIMITY TO THE SIX PRIORITY SITES, ACCESS CONSIDERATIONS, SITE ISOLATION, ENVIRONMENTAL RISK, LAND USE, AND COMPATIBILITY WITH THE ACCELERATED SCHEDULE. AFTER ASSIGNING A SCORE TO EACH CRITERIA, TIMES BEACH WAS DETERMINED TO BE THE MOST DESIRABLE LOCATION WITH A POINT TOTAL OF 35, FOLLOWED BY FORT CROWDER WITH 29, AND 4 OTHER SITES WITH 24. ONE ADVANTAGE OF TIMES BEACH IS ITS CENTRAL LOCATION TO THE SIX PRIORITY SITES, WHILE FORT CROWDER IS LOCATED ABOUT 275 MILES AWAY. OTHER ADVANTAGES OF TIMES BEACH INCLUDE THE FACT THAT IT IS ALREADY CONTAMINATED WITH DIOXIN (THIS IS TRUE FOR ONLY TWO OTHER SITES CONSIDERED) AND THUS WILL NOT RESULT IN CONTAMINATING A CLEAN AREA; IT HAS GOOD ACCESS; AND THE FACILITY WILL RESULT IN MINIMUM LAND USE IMPACT. ALSO, THE IMMINENT STATE OWNERSHIP OF TIMES BEACH IS EXTREMELY IMPORTANT WITH RESPECT TO THE SCHEDULE FOR EXPEDITED CONSTRUCTION OF THE STORAGE FACILITY WHICH IS NECESSARY TO ALLOW FOR THE EXCAVATION AND RESTORATION OF SOME PRIORITY SITES IN THE 1984 CONSTRUCTION SEASON. UNDER SECTION 104(C)(3) OF CERCLA, THE STATE MUST ASSURE THE AVAILABILITY OF AN ACCEPTABLE HAZARDOUS WASTE DISPOSAL AND THE STATE OF MISSOURI HAS OFFICIALLY DESIGNATED TIMES BEACH AS THE SITE. IN ADDITION, THE MISSOURI DIOXIN TASK FORCE RECOMMENDED THAT THE SEARCH FOR A SITE BE LIMITED TO STATE-OWNED LAND TO EXPEDITE CONSTRUCTION OF THE FACILITY. THEREFORE, DESPITE ITS LOCATION IN THE FLOODPLAIN, TIMES BEACH IS UNIQUELY QUALIFIED, IS THE MOST FEASIBLE SITE, AND IS PROBABLY THE ONLY SITE AT WHICH AN INTERIM STORAGE FACILITY CAN BE CONSTRUCTED BY NEXT SUMMER.

EXECUTIVE ORDER 11988 AND APPENDIX A OF 40 CFR PART 6 PROVIDE GUIDANCE FOR EPA ACTIVITIES CARRIED OUT IN A FLOODPLAIN. IN GENERAL, EPA SHOULD:

- DETERMINE WHETHER OR NOT THE PROPOSED ACTION IS LOCATED IN OR WILL LIKELY AFFECT A FLOODPLAIN.

- PROVIDE EARLY PUBLIC NOTICE OF THE PROPOSED ACTION.

- IF THERE IS NO PRACTICABLE ALTERNATIVE TO LOCATING IN OR AFFECTING A FLOODPLAIN, ACT TO MINIMIZE POTENTIAL HARM TO THE FLOODPLAIN.

- PREPARE A STATEMENT OF FINDINGS.

- ALLOW AT LEAST FIFTEEN WORKING DAYS FOR PUBLIC AND INTERAGENCY REVIEW OF THE STATEMENT OF FINDINGS.

- IN THOSE CASES WHERE AN ENVIRONMENTAL ASSESSMENT OR AN ENVIRONMENTAL IMPACT STATEMENT IS NOT PREPARED, PREPARE A FLOODPLAIN ASSESSMENT.

- PROVIDE FOR PUBLIC REVIEW OF THE FLOODPLAIN ASSESSMENT.

- CONSTRUCT ANY FACILITIES IN ACCORDANCE WITH THE NATIONAL FLOOD INSURANCE PROGRAM EXCEPT TO THE EXTENT THAT THE NFIP STANDARDS ARE DEMONSTRATED TO BE INAPPROPRIATE.

- UNDERTAKE FLOODPROOFING AND OTHER FLOOD PROTECTION MEASURES FOR NEWLY CONSTRUCTED STRUCTURES AND FACILITIES.

THE ANALYSIS OF ALTERNATIVE SITES IN THE FEASIBILITY STUDY ADOPTED IN THIS DECISION, DETERMINED THAT THERE IS NO FEASIBLE ALTERNATIVE TO LOCATING IN THE FLOODPLAIN. A COMPUTER-AIDED HYDRAULICS ANALYSIS BY THE US ARMY CORPS OF ENGINEERS HAS INDICATED THAT A STORAGE FACILITY CAN BE LOCATED IN TIMES BEACH WITHOUT CAUSING ANY SIGNIFICANT IMPACTS ON FLOOD HEIGHTS. THE MAXIMUM IMPACT OF A STORAGE FACILITY WOULD NOT EXCEED A 0.15 FOOT INCREASE IN FLOOD HEIGHTS. FLOOD HEIGHTS IN THE NEIGHBORING TOWN OF EUREKA WILL NOT BE AFFECTED. A STATEMENT OF FINDINGS IS INCLUDED AS AN ATTACHMENT TO THIS DOCUMENT, AND WILL BE DISTRIBUTED THROUGH THE APPROPRIATE CLEARINGHOUSE FOR PUBLIC REVIEW.

PUBLICATION OF THE FEASIBILITY STUDY, THE PUBLIC MEETING DECEMBER 13, AND THE PUBLIC COMMENT PERIOD HAVE SERVED TO PROVIDE EARLY NOTICE OF THE PROPOSED ACTION. A FLOODPLAIN ASSESSMENT WILL BE PREPARED TO FURTHER ANALYZE FLOOD IMPACTS, DESIGN CONSIDERATIONS (INCLUDING FLOODPROOFING AND OTHER PROTECTIVE MEASURES), AND ACTIONS TO MINIMIZE ANY POTENTIAL HARM TO THE FLOODPLAIN. THE ASSESSMENT WILL DISCUSS NATIONAL FLOOD INSURANCE PROGRAM REQUIREMENTS AND COMPLIANCE OF THE PROPOSED FACILITY. THE ASSESSMENT WILL UNDERGO PUBLIC REVIEW PRIOR TO THE START OF CONSTRUCTION.

2. IF TCDD WERE A LISTED HAZARDOUS WASTE UNDER THE RESOURCE CONSERVATION AND RECOVERY ACT, A RCRA PERMIT WOULD BE REQUIRED FOR CONSTRUCTING AND UTILIZING A STORAGE FACILITY FOR THAT SUBSTANCE. HOWEVER, TCDD IS NOT EXPECTED TO BE A RCRA WASTE UNTIL THE SUMMER OF 1984, AND THIS LISTING WILL NOT BECOME EFFECTIVE UNTIL SIX MONTHS LATER. IN ORDER TO PROVIDE THE PUBLIC WITH AN OPPORTUNITY TO COMMENT ON THE FACILITY SIMILAR TO THE OPPORTUNITIES THAT WOULD OCCUR IF A RCRA PERMIT WERE NECESSARY, A COMPLETE APPLICATION FOR A RCRA PERMIT WILL BE PREPARED AND WILL BE MADE AVAILABLE FOR PUBLIC COMMENT. A PUBLIC MEETING WILL BE HELD TO DISCUSS THE APPLICATION IN CONJUNCTION WITH A PUBLIC HEARING REQUIRED UNDER STATE REGULATIONS TO ADDRESS THE STATE'S APPLICATION FOR A STATE HAZARDOUS WASTE PERMIT. THE FACILITY WILL BE DESIGNED ACCORDING TO RCRA REGULATIONS SUCH THAT IT WOULD BE FULLY PERMITTABLE UNDER EXISTING RCRA REGULATIONS.

3. THE COST ESTIMATES LISTED EARLIER ARE EPA'S BEST APPROXIMATIONS BUT ARE SUBJECT TO ERROR FOR THE SAME REASONS THAT ANY SUCH ESTIMATES ARE. THE PRIMARY UNCERTAINTY IS THE ACTUAL VOLUME OF SOIL THAT MUST BE EXCAVATED FROM THE SITES. PREVIOUS SAMPLING HAS INDICATED THAT DIOXIN CONTAMINATION EXISTS AT DEPTHS OF UP TO FIVE FEET. HOWEVER, THE LOW WATER SOLUBILITY AND STRONG SOIL BINDING PROPERTIES OF TCDD INDICATE THAT IT IS UNLIKELY THAT TCDD COULD EASILY MOVE THAT FAR INTO THE SOIL. RECENT UNPUBLISHED RESULTS FROM A STUDY OF SOIL SAMPLING TECHNIQUES BY THE REGION VII ENVIRONMENTAL SERVICES DIVISION INDICATE THAT THE PREVIOUS RESULTS SHOWING THAT TCDD EXISTS AT DEPTHS BELOW TWO FEET MAY BE IN ERROR, AND THAT THE ERRORS MIGHT HAVE BEEN CAUSED BY THE SAMPLING TECHNIQUES USED IN THE PAST. BECAUSE OF THE UNCERTAINTIES THAT CURRENTLY EXIST, IT IS NOT POSSIBLE TO PREDICT ACCURATELY THE DEPTH TO WHICH THE CONTAMINATED SOIL WILL HAVE TO BE EXCAVATED AT THE SIX SITES. THE SOIL VOLUME ESTIMATES USED IN PREPARING THE COST ESTIMATES ASSUMED DIOXIN MAY EXIST AT DEPTHS UP TO FIVE FEET.

LOWER SOIL VOLUME WILL DECREASE THE COSTS FOR ALTERNATIVES INVOLVING EXCAVATION AND SOIL HANDLING (B THROUGH F) WHILE HAVING LITTLE EFFECT ON THE INPLACE STABILIZATION OPTION SINCE THE EXTENT OF CONTAMINATION WILL NOT BE AFFECTED. THEREFORE, THIS FACTOR WILL NOT AFFECT THE RESULTS OF THE COST-EFFECTIVENESS ANALYSIS. THE VOLUME ESTIMATES AND OTHER TECHNICAL QUESTIONS WILL BE SUBJECTS OF CONTINUING EXAMINATION OVER THE NEXT SEVERAL MONTHS BY A TEAM OF EPA, STATE, AND CONTRACTOR REPRESENTATIVES WHO WILL COMPRISE AN EXTENT OF REMEDY WORK GROUP. THIS GROUP WILL ESTABLISH PROCEDURES FOR TEMPORARY RELOCATIONS ADDRESSING IMPORTANT PUBLIC HEALTH QUESTIONS SUCH AS WHO SHOULD BE RELOCATED AND FOR HOW LONG. A TRANSPORTATION PLAN WHICH IS TECHNICALLY SOUND AND ACCEPTABLE TO THE PUBLIC WILL BE DEVELOPED. THE GOAL WILL BE TO MINIMIZE THE POTENTIAL OF EXPOSURE THROUGH ATTENTION TO HANDLING, TRANSPORT, AND ROUTING ALTERNATIVES.

ADDITIONAL ISSUES THAT WILL BE RESOLVED BY THE EXTENT OF REMEDY GROUP INCLUDE DUST SUPPRESSION ASSURANCE OF CONTAMINANT REMOVAL, PROCEDURES FOR CLEANING HOUSES, AND OTHERS. IN ORDER TO ENSURE EFFECTIVE COMMUNICATION WITH THE PUBLIC, PUBLIC AFFAIRS PERSONNEL FROM EPA, THE STATE AND THE REM/FIT CONTRACTOR ARE MEMBERS OF THE EXTENT OF REMEDY GROUP. ALSO, THE COMMUNITY RELATIONS PLAN WILL DEFINE IN DETAIL THE PROCEDURES TO BE FOLLOWED IN DISSEMINATING INFORMATION AND ADDRESSING COMMENT ON THESE ISSUES OF INTEREST TO RESIDENTS NEAR THE SITES AND NEAR TRANSPORTATION ROUTES.

OFF-SITE DISPOSAL ANALYSIS

AT THE PUBLIC MEETING ON DECEMBER 13, 1983, RESIDENTS FROM QUAIL RUN AND SONTAG ROAD ASKED EPA TO GIVE ADDITIONAL CONSIDERATION TO IN-PLACE STABILIZATION OF CONTAMINATED SOIL AND PERMANENT RELOCATION OF SITE RESIDENTS. THIS ALTERNATIVE WAS ADDRESSED IN THE FEASIBILITY STUDY AND ESTIMATED TO COST $41.5 MILLION. AN IMPERVIOUS COVER WAS ASSUMED WITH SURFACE WATER DIVERSION AND A DOUBLE GROUT CURTAIN AROUND THE MINKER AND STOUT SITES. RESIDENTS ON ALL SIX SITES WOULD RECEIVE PERMANENT RELOCATION AND HOMES WOULD BE DEMOLISHED AND BURIED. A LONG TERM MONITORING PROGRAM WAS ASSUMED AT EACH SITE FOR 30 YEARS.

SOME COST SAVINGS COULD BE REALIZED FOR THE STABILIZATION ALTERNATIVE BY UTILIZING A POROUS COVER INSTEAD OF THE IMPERVIOUS COVER. THIS WOULD BE MOST APPROPRIATE FOR THE STEEP WOODED SLOPES AT THE MINKER SITE WHERE A POROUS COVER WOULD ENABLE THE TREES TO SURVIVE SO THEIR ROOT STRUCTURE COULD CONTINUE TO STABILIZE THE HILLSIDE. HOWEVER, AN IMPERVIOUS COVER IS PREFERABLE FOR MOST AREAS BECAUSE IT ELIMINATES THE POTENTIAL FOR MIGRATION ASSOCIATED WITH WATER PERCOLATION THROUGH THE SOIL AND IT PROVIDES GREATER ASSURANCE THAT CONTAMINATION WILL NOT REACH THE SURFACE. POROUS COVERS WOULD REQUIRE A GREATER MONITORING EFFORT AND NO SUBSTANTIAL NET COST SAVINGS WOULD RESULT. THE GROUT CURTAIN AT THE MINKER AND STOUT SITES WOULD COST $15 MILLION AND IT IS POSSIBLE THAT LIMESTONE FRACTURES UNDER THESE SITES COULD TRANSMIT CONTAMINATED SOIL. ADDITIONAL TESTING WOULD BE NECESSARY TO ASSESS THE NEED FOR THE CURTAIN WALLS. HOWEVER, EVEN IF THEY WERE ELIMINATED, THE INPLACE STABILIZATION ALTERNATIVE WOULD COST $26.5 MILLION COMPARED TO $15.8 MILLION FOR THE PROPOSED INTERIM OFF-SITE STORAGE OPTION. THE STABILIZATION OPTION INCLUDES 30 YEARS OF MONITORING AT EACH OF THE SIX SITES. THE COST FOR A SIMILAR MONITORING PROGRAM WAS NOT INCLUDED FOR THE INTERIM STORAGE ALTERNATIVE. HOWEVER, THIS COST WOULD BE ABOUT $0.5 MILLION AND WOULD NOT AFFECT THE RESULTS OF THE COST-EFFECTIVENESS ANALYSIS.

AN ADVANTAGE OF THE PROPOSED ALTERNATIVE IS THAT THE SOIL WILL BE EXCAVATED AND CENTRALIZED IN ONE PLACE FOR EASY ACCESS SHOULD A TREATMENT ALTERNATIVE BECOME AVAILABLE. ALSO, THE IMPERVIOUS SOIL COVER WHICH WOULD BE PART OF THE INPLACE OPTION WOULD ADD CONSIDERABLY TO THE VOLUME OF CONTAMINATED MATERIAL WHICH WOULD EVENTUALLY HAVE TO BE EXCAVATED AND TREATED. THE PROPOSED ALTERNATIVE, ON THE OTHER HAND, IS CONSISTENT WITH THE POSSIBILITY OF THE EVENTUAL DESTRUCTION OF DIOXIN ONCE A FEASIBLE TECHNOLOGY IS AVAILABLE. MOST OF THE COST IS ATTRIBUTABLE TO SOIL EXCAVATION, TRANSPORTATION, RESTORATION, AND TEMPORARY RELOCATION OF ADJOINING RESIDENTS, ALL OF WHICH WOULD BE NECESSARY SHOULD TREATMENT MEASURES BE SELECTED IN THE FUTURE.

A SECOND "ON-SITE" ALTERNATIVE WHICH WOULD INCLUDE PERMANENT RELOCATION WAS ALSO ADDRESSED IN THE FEASIBILITY STUDY AND CONSISTS OF EXCAVATION AND CONTAINMENT IN INDIVIDUAL STORAGE FACILITIES. TO ACHIEVE ECONOMIES OF SCALE, SOIL FROM THE STOUT, CASHEL, AND SULLINS SITES WOULD BE HAULED TO THE MINKER SITE. A MONOFILL STORAGE FACILITY WAS PREVIOUSLY PROPOSED FOR THE MINKER SITE BUT IT MET WITH CONSIDERABLE PUBLIC OPPOSITION. THE COST FOR ON-SITE STORAGE FACILITIES IS ESTIMATED AS $35 MILLION. THUS, THE PROPOSED OFF-SITE ALTERNATIVE IS MORE COST-EFFECTIVE THAN EITHER OF THE ON-SITE ALTERNATIVES, INPLACE STABILIZATION OR INDIVIDUAL STORAGE FACILITIES. FINALLY, PERMANENT RELOCATION OF QUAIL RUN AND SONTAG ROAD RESIDENTS IS NOT CURRENTLY WITHIN EPA'S AUTHORITY, SINCE THOSE SITES ARE NOT ON THE NATIONAL PRIORITIES LIST.

**#CR**
**COMMUNITY INVOLVEMENT**

THE FEASIBILITY STUDY WAS DISTRIBUTED TO THE PUBLIC DECEMBER 7, 1983, AND A PUBLIC MEETING TO PRESENT AND ACCEPT COMMENTS ON THE RECOMMENDED ALTERNATIVE WAS HELD DECEMBER 13, 1983. ADDITIONAL COMMENTS WERE ACCEPTED IN WRITING UNTIL DECEMBER 27, 1983. A RESPONSIVENESS SUMMARY DETAILING AND ADDRESSING THE COMMENTS HAS BEEN PREPARED AND IS ATTACHED AS AN APPENDIX TO THE RECORD OF DECISION. THE MAJOR COMMENTS AND BRIEF RESPONSES ARE:

- SEVERAL PEOPLE REITERATED EARLIER REQUESTS FOR A BUY OUT RATHER THAN REMEDIAL ACTIONS.

A BUY OUT WOULD ADEQUATELY PROTECT THE HEALTH OF THE PERSONS PERMANENTLY RELOCATED. HOWEVER, DUE TO THE POTENTIAL FOR FURTHER MIGRATION OF THE CONTAMINATION, A BUY OUT WOULD NOT PROTECT THE HEALTH OF OTHER PERSONS, NOR WOULD IT ADEQUATELY PROTECT THE ENVIRONMENT. EPA WOULD STILL HAVE TO CLEAN UP THE SITES. THUS, A BUYOUT WOULD BE AN ADDITIONAL EXPENSE, RATHER THAN AN ALTERNATIVE TO THE PROPOSED ACTIONS. MOREOVER, A BUY OUT IS NOT PRESENTLY AN OPTION FOR THE PLANNED REMOVALS AT QUAIL RUN AND SONTAG ROAD.

- SEVERAL PEOPLE, PARTICULARLY RESIDENTS OF EUREKA, WANTED COMMITMENTS THAT THE FACILITY WOULD NOT BE USED FOR OTHER TYPES OF WASTES AND THAT THE FACILITY WOULD NOT BE PERMANENT.

EPA WILL COMMIT TO NOT USING THE FACILITY FOR WASTES OTHER THAN THOSE FROM DIOXIN SITES IN MISSOURI. THE FACILITY WILL BE TEMPORARY UNTIL A MEANS TO DESTROY THE DIOXIN IS DEVELOPED. EPA IS DEVELOPING A RESEARCH PROGRAM TO STUDY MEANS FOR DESTROYING THE DIOXIN, AS PART OF THE NATIONAL DIOXIN STRATEGY.

- THERE WERE SEVERAL COMMENTS THAT THE FACILITY SHOULD NOT BE BUILT IN A FLOODPLAIN; THAT IT WOULD NOT BE SAFE AND THAT IT WOULD NOT BE CONSISTENT WITH GOVERNMENT POLICY.

THE SAFETY OF THE FACILITY WILL BE ASSURED BY PROPER ENGINEERING AND DETAILED ANALYSIS OF FLOOD HEIGHT IMPACTS. BUILDING THE FACILITY IN A FLOODPLAIN IS CONSISTENT WITH GOVERNMENT POLICY UNDER CERTAIN CONDITIONS THAT ARE BEING MET.

- THERE WERE SEVERAL COMMENTS ABOUT THE NEED FOR SPECIAL PRECAUTIONS IN TRANSPORTING THE SOIL TO TIMES BEACH.

EPA IS VERY MUCH AWARE OF THE NEED FOR SPECIAL MEASURES. APPLICATIONS OF STANDARD METHODS WILL ADEQUATELY ADDRESS THIS PROBLEM AND WE HAVE ESTABLISHED A PROCESS TO WORK OUT TRANSPORTATION METHODS IN CONCERT WITH THE PUBLIC.

- THERE WERE SOME REQUESTS, INCLUDING ONE FROM THE STATE SENATE, THAT EPA CONSIDER EVERY AVAILABLE OPTION RATHER THAN LOCATING IN A FLOODPLAIN.

THE FEASIBILITY STUDY INCLUDED A SITE-BY-SITE ANALYSIS OF EVERY ALTERNATIVE SITE THAT COULD BE IDENTIFIED. FOR REASONS STATED IN THE FEASIBILITY STUDY, TIMES BEACH WAS SELECTED AS THE BEST SITE FOR THE FACILITY.

A COMMUNITY RELATIONS PLAN IS BEING PREPARED. COMMUNITY RELATIONS WILL BE MORE COMPLEX FOR THIS RESPONSE ACTIVITY THAN FOR MOST BECAUSE OF THE NUMBER OF SITES INVOLVED, THE RESIDENTIAL NATURE OF THE SITES, THE CONSTRUCTION OF A STORAGE FACILITY IN A FLOODPLAIN, THE NEED TO TRANSPORT THE SOIL THROUGH ADJOINING RESIDENTIAL AREAS, AND THE AMOUNT OF INFORMATION THAT WILL HAVE TO BE COMMUNICATED TO THE PUBLIC. THE COMMUNITY RELATIONS PLAN AND THE ACTIVITIES IT GUIDES WILL BE DESIGNED TO ADDRESS EACH OF THESE SPECIAL PUBLIC CONCERNS.

**#ENF**
**ENFORCEMENT**

THE DEPARTMENT OF JUSTICE IS ABOUT TO FILE A LAWSUIT ON BEHALF OF EPA FOR REMEDIAL ACTIONS AT SIX SITES IN MISSOURI, NONE OF WHICH IS ADDRESSED BY THIS RECORD OF DECISION. HOWEVER, CURRENT NEGOTIATIONS WITH ONE OF THE PROBABLE RESPONSIBLE PARTIES ARE AIMED AT SEEKING A SOLUTION TO THE TOTAL MISSOURI DIOXIN PROBLEM. THE RESULTS FROM THESE NEGOTIATIONS SHOULD BE KNOWN SOON. THE ONLY ENFORCEMENT ACTION TAKEN AT THE SIX SITES ADDRESSED BY THIS RECORD OF DECISION WERE NOTICE LETTERS SENT TO POTENTIALLY RESPONSIBLE PARTIES AT MINKER, STOUT, AND SONTAG ROAD.

**#RA**
**RECOMMENDED ACTION**

SECTION 300.68(J) OF THE NATIONAL CONTINGENCY PLAN (47 FR 31180, JULY 16, 1983) STATES THAT THE APPROPRIATE REMEDIAL ACTION SHALL BE DETERMINED BY THE LEAD AGENCY'S SELECTION OF THE ALTERNATIVE WHICH THE AGENCY DETERMINES THE MOST COST-EFFECTIVE (I.E., THE LOWEST COST ALTERNATIVE THAT IS TECHNOLOGICALLY FEASIBLE AND RELIABLE) AND WHICH EFFECTIVELY MITIGATES AND MINIMIZES DAMAGE TO AND PROVIDES ADEQUATE PROTECTION OF PUBLIC HEALTH, WELFARE, AND THE ENVIRONMENT. SECTION 300.67(A)(2) OF THE NCP PROVIDES FOR UNDERTAKING A PLANNED REMOVAL WHEN THE LEAD AGENCY DETERMINES THAT THE PUBLIC AND/OR ENVIRONMENT WILL BE AT RISK FROM EXPOSURE TO HAZARDOUS SUBSTANCES IF RESPONSE IS DELAYED AT A RELEASE NOT ON THE NATIONAL PRIORITIES LIST. BASED ON OUR EVALUATION OF THE COST-EFFECTIVENESS OF THE PROPOSED ALTERNATIVES, THE PUBLIC AND ENVIRONMENTAL RISK FROM EXPOSURE TO THE DIOXIN CONTAMINATED SOIL, (NOTING THE CDC HEALTH ADVISORIES) AND THE COMMENTS RECEIVED FROM THE PUBLIC, WE RECOMMEND THE INTERIM OFFSITE STORAGE ALTERNATIVE. THIS PROJECT ENTAILS CONSTRUCTION OF A 50,000 CUBIC YARD INTERIM STORAGE FACILITY AT TIMES BEACH. THE FLOODPLAIN ASSESSMENT, PERMIT APPLICATIONS, DESIGN, BID PACKAGES, AND CONSTRUCTION MANAGEMENT WILL BE THE RESPONSIBILITY OF CH2M HILL. THE FACILITY WILL BE A CONCRETE TANK WITH A FLEXIBLE COVER WHICH IS PROTECTED FROM FLOODING. SIX SITES WILL BE RESTORED WITH THE CONTAMINATED SOIL HAULED TO AND STORED IN THE INTERIM STORAGE FACILITY. THE WORK AT EACH SITE INCLUDES EXCAVATION, TEMPORARY RELOCATION, AND ALL NECESSARY RESTORATION LEADING TO REINHABITATION. MINKER (INCLUDING THE NEIGHBORS), STOUT, SULLINS, AND CASHEL WILL BE ADDRESSED AS REMEDIAL PROJECTS AND CH2M HILL WILL BE RESPONSIBLE FOR SUBCONTRACTING AND CONSTRUCTION MANAGEMENT.

SONTAG ROAD AND QUAIL RUN WILL BE ADDRESSED AS PLANNED REMOVALS WITH CONSTRUCTION MANAGEMENT BY CH2M HILL OR BY THE ERCS CONTRACTOR. AT QUAIL RUN, THE PROPOSED PROJECT INCLUDES NECESSARY ACTIONS, WITHIN THE AUTHORITY OF THE NATIONAL CONTINGENCY PLAN, TO RESPOND TO THE CONTAMINATION OF THE MOBILE HOMES. BEFORE BEGINNING CONSTRUCTION, A STATE SUPERFUND CONTRACT (SSC) WILL BE NEGOTIATED WITH THE STATE FOR THE RESPONSE ACTIONS. A DRAFT SSC HAS BEEN PREPARED AND SENT TO THE STATE.

THE PROPOSED PROJECT ALSO INCLUDES CONSTRUCTION OF SPUR LEVEES AT TIMES BEACH TO MINIMIZE AND CONTROL EROSION AND TRANSPORT OF CONTAMINATED SOIL PARTICLES ALREADY AT THE SITE IN THE EVENT THAT FLOODING OCCURS BEFORE RESPONSE ACTIONS CAN BE COMPLETED. THE LEVEES ARE INDEPENDENT OF THE INTERIM STORAGE FACILITY FOR THE SIX SITES AND WILL BE DESIGNED AND CONSTRUCTED BY THE U.S. ARMY CORPS OF ENGINEERS.

FOLLOWING IS A SUMMARY OF THE PROJECTED COSTS:

| | COST * (X $1000) |
|---|---|
| STUDIES, DESIGN, INVESTIGATIONS, BID PACKAGES | 995 |
| SITE PREPARATION AND STORAGE FACILITY CONSTRUCTION | 2,294 |
| MINKER, STOUT, SULLINS, CASHEL REMEDIAL ACTIONS | 4,069 |

* WITH 25% CONTINGENCY

| | COST * (X $1000) |
|---|---|
| QUAIL RUN AND SONTAG ROAD REMOVAL ACTIONS | 7,588 |
| FILLING STORAGE TANK AND O&M | 438 |
| SPUR LEVEES | 350 |
| TOTAL | $15,734 |

* WITH 25% CONTINGENCY.

OTHER DOCUMENTS

THE FOLLOWING DOCUMENTS ARE ATTACHED.

1) TRANSMITTAL LETTER FROM THE REGION VII ADMINISTRATOR RECOMMENDING THE SELECTED OPTION.
2) LETTER FROM FRED LAFSER, DIRECTOR, MISSOURI DEPARTMENT OF NATURAL RESOURCES GIVING THE THREE NECESSARY ASSURANCES AND REQUESTING THE PLANNED REMOVALS AT SONTAG ROAD AND QUAIL RUN.
3) CENTRAL STORAGE SITE REPORT, FEASIBILITY STUDY, MISSOURI DIOXIN SITES. DECEMBER 6, 1983.
4) RESPONSIVENESS SUMMARY.
5) FINAL REPORT OF THE MISSOURI DIOXIN TASK FORCE.
6) DRAFT PHASE I FEASIBILITY STUDY, MINKER/STOUT IMPERIAL, MISSOURI.
7) DRAFT INITIAL REMEDIAL MEASURE, MINKER SITE, IMPERIAL, MISSOURI.
8) QUICK RESPONSE ENGINEERING ASSESSMENT OF REMOVAL OPTIONS FOR QUAIL RUN.
9) QUICK RESPONSE ENGINEERING ASSESSMENT OF REMOVAL OPTIONS FOR SONTAG ROAD.
10) QUICK RESPONSE ENGINEERING ASSESSMENT OF REMOVAL OPTIONS FOR THE SULLINS SITE.
11) REPORT ON ADVANCE PREPARATION/EMERGENCY RESPONSE (USACE "SPUR LEVEE REPORT"), NOVEMBER 1983.
12) TIMES BEACH ADVANCE PREPARATION/EMERGENCY RESPONSE REPORT REVIEW (CH2M HILL), DECEMBER 12, 1983.
13) STATEMENT OF FINDINGS (A SPECIAL DECISION DOCUMENT REQUIRED BY 40 CFR 6 APPENDIX A RELEVANT TO E.O. 11988).
14) MISSOURI CLEARINGHOUSE REVIEW ON INTERIM CENTRAL STORAGE FACILITY (LETTER COMING - TCR INCLUDED).